[0022] It should be recognized that which longitudinal end is the front or rear may be arbitrary as a rider may mount from either direction (though the device may be made with a dedicated front and rear).

[0023] Note that equal and opposite tilting of the connecting members **21**C,**22**C would allow the device to pivot in place, something prior art auto-balancing skateboard devices cannot achieve.

[0024] By affording independent, or relative difference based, control of two drive wheels, the present invention is able to achieve much more responsive turning than available in prior art devices. Further, it is achieved in a manner that is intuitive to a rider, which makes learning to ride easier, and increases the potential uses of the device—commuting, recreation, games and competitions, etc.

[0025] It should also be recognized that in the present invention, the platform has a greater longitudinal dimension than lateral dimension. This may be simply longer than wide, or 1.5× longer, or 2× longer or 2.5× longer than wide, or more.

[0026] Referring to FIGS. **3**-**4**, another embodiment of an auto-balancing device **110** with a longitudinally disposed platform **115** in accordance with the present invention is shown.

[0027] Device **110** is similar to device **10** and similar components may have the same reference numerals in the tens and ones digits. One difference is that while platform **15** of device **10** is two physically separate items, i.e., not directly connected, the two platform sections **121**,**122** of platform **115** are coupled by a flexible membrane **140**. The membrane is preferably coupled to the platform sections in such a way as to give the feel of one contiguous platform surface yet afford sufficient flexibility such that the platform sections can move in fore-aft tilt relative to one another. The membrane may be made of latex rubber or flexible plastic or other suitable material.

[0028] Similar to device **10**, each platform section **121**,**122** has a front subsection **121**A,**122**A, a rear subsection **121**B, **122**B, and a connecting member **121**C,**122**C therebetween.

[0029] FIG. **4** illustrates one potential assembly technique for device **110**. Arrow A indicates the platform being mounted to FPUs **130**,**150**. Platform **115** may be screwed to the FPUs or otherwise fastened. Coupling techniques for joining the FPUs are known in the art.

[0030] Referring to FIGS. **5** and **6**, yet another embodiment of an auto-balancing device **210** with a longitudinally disposed platform **215** in accordance with the present invention is shown.

[0031] Device **210** includes a contiguous or one piece platform **215**, albeit preferably with a longitudinally disposed hole **271** in it to enhance twisting. Platform **215** preferably has subsections **221**A,**222**A up front, subsections **221**B,**222**B in the rear, and connecting members **221**C,**222**C therebetween.

[0032] FIG. **6** illustrates where a rider might stand. For example, one foot **5** at the front and one foot **6** at the rear. It can be seen that each foot touches a pair of subsections. As a rider leans forward or rearward (in the line of direction of travel) the device will go in that direction, however, when a rider twists the platform longitudinally, the connecting members **221**C,**222**C will experience different fore-aft tilt angles causing the device to turn.

[0033] Referring to FIG. **7**, a perspective view of another embodiment of an auto-balancing device **310** with longitudinally disposed platform in accordance with the present invention is shown. Device **310** includes a flexible platform **315** with holes therein. Center hole **371** accommodates two drive wheels **330**,**350** that extend above the platform's top surface. Holes **372** are provided at the longitudinal ends (at subsections **321**A,**322**A,**321**B,**322**B) to facilitate twisting.

[0034] Device **310** operates similar to device **210**. A rider standing skateboard style leans forward or rearward to initiate movement and twists the board by alternatively applying weight to the balls and heels of his or her feet. This twisting causes connecting members **321**C,**322**C to have different fore-aft tilt angles, as detected by sensors **335**,**355**, respectively, to achieve a turning of the device.

[0035] While the invention has been described in connection with specific embodiments thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains and as may be applied to the essential features hereinbefore set forth, and as fall within the scope of the invention and the limits of the appended claims.

1. An auto-balancing transportation device, comprising:

a platform having first and second front subsections and first and second rear subsections, and a first connecting member located between the first front and rear subsections and a second connecting member located between the second front and rear subsections;

a first wheel, a first drive motor, and a first sensor associated with the first connecting member;

a second wheel, a second drive motor, and a second sensor associated with the second connecting member;

a control circuit that drives the first drive motor toward auto-balancing the first connecting member based on data from the first sensor and that drives the second drive motor toward auto-balancing the second connecting member based on data from the second sensor; and

wherein the fore-aft tilt angle of the first and second connecting members is changeable by a rider during use and a difference in fore-aft tilt angle between the first and second connecting members achieves differential driving of the first and second wheels and a turning of the device.

2. The device of claim **1**, wherein the platform is greater in longitudinal dimension than lateral dimension.

3. The device of claim **1**, wherein the platform is 1.5 times or more greater in longitudinal dimension than lateral dimension.

4. The device of claim **1**, wherein the first and second wheels are wholly below the platform.

5. The device of claim **1**, wherein the first and second wheels are in part below the platform and in part above the platform.

6. The device of claim **1**, wherein the first sensor senses fore-aft tilt angle of the first connecting member.

7. The device of claim **1**, wherein the first and second connecting members are substantially parallel to one another, and are physically separate from one another.

8. The device of claim **1**, wherein the first and second connecting members are coupled to one another through a flexible coupler.